

CLAIMS

1. An exhaust processor kit having component parts capable of being assembled at an exhaust processor assembly site to provide an exhaust processor assembly configured to be mounted in a vehicle exhaust system to treat combustion product flowing therethrough, the kit comprising the combination of at least two separate exhaust processor modules adapted to be arranged to lie in series in end-to-end relation to establish a combustion product flow conduit having an upstream inlet and a downstream outlet,
- an exhaust inlet module having an inlet end adapted to be coupled to a combustion product source pipe and an outlet end adapted to be coupled to the upstream inlet of the combustion product flow conduit,
- an exhaust outlet module having an inlet end coupled to the downstream outlet of the combustion product flow conduit and an outlet end adapted to be coupled to a combustion product discharge pipe, and
- a weldment seal adapted to be applied to a junction between each pair of adjacent modules to provide an annular sealed connection at each junction and to retain each pair of adjacent modules in fixed relation to one another.
2. The kit of claim 1, further comprising a contaminant-filter inventory comprising a plurality of modular contaminant filters of varying types and wherein the at least two separate exhaust processor modules includes a first of the types of modular contaminant filters.
3. The kit of claim 2, further comprising a noise-filter inventory comprising a plurality of modular noise filters of varying types and wherein the at least two separate exhaust processor modules further includes a first of the types of modular noise filters.
4. The kit of claim 3, wherein the at least two separate exhaust processor modules further includes a second of the types of modular contaminant filters.
5. The kit of claim 2, wherein the at least two separate exhaust processor modules further includes a second of the types of modular contaminant filters.

6. The kit of claim 5, wherein the first of the types of modular contaminant filters includes means for filtering hydrocarbon material out of a stream of combustion product passing therethrough and the second of the types of modular contaminant filters includes means for filtering oxides of nitrogen out of the stream of combustion product passing therethrough.

7. The kit of claim 2, further comprising an exhaust flow-diffuser inventory comprising a plurality of modular exhaust flow diffusers of varying types and wherein the at least two separate exhaust processor modules further includes a first of the types of modular exhaust flow diffusers.

8. The kit of claim 1, further comprising a noise-filter inventory comprising a plurality of modular noise filters of varying types and wherein the at least two separate exhaust processor modules includes a first of the types of modular noise filters and further comprising an inventory of modular tuning-volume containers, a first of the modular tuning-volume containers having an interior region defining a first volume and a second of the modular tuning-volume containers having an interior region defining a second volume larger than the first volume, and wherein one of the first and second modular tuning-volume containers is included in the at least two separate exhaust processor modules and arranged to place the interior region of said one of the first and second modular tuning-volume containers in acoustic communication with an interior region of the first of the types of modular noise filter to add tuning volume to the first of the types of modular noise filter.

9. The kit of claim 8, further comprising a contaminant-filter inventory comprising a plurality of modular contaminant filters of varying types and wherein the at least two separate exhaust processor modules includes a first of the modular contaminant filters and the one of the first and second modular tuning-volume containers is interposed between the first type of modular contaminant filter and the first type of modular noise filter.

10. An exhaust processor kit having component parts capable of being assembled at an exhaust processor assembly site to provide an exhaust processor assembly configured to be mounted in a vehicle exhaust system to treat combustion product flowing therethrough, the kit comprising the combination of an exhaust inlet module adapted to be coupled to a combustion product source pipe,

at least two separate exhaust processor modules adapted to be arranged to lie in series to provide a module conduit having an inlet end adapted to be coupled to the exhaust inlet module to receive combustion product discharged therefrom and an outlet end adapted to be coupled to the exhaust outlet module to cause combustion product that has passed through each of the separate exhaust processor modules to be discharged into the exhaust outlet module, each exhaust processor module including a female processor end adapted to be coupled to one of two adjacent exhaust processor modules and a male processor end adapted to be coupled to another of the two adjacent exhaust processor modules, and a combustion product flow passage extending between the female and male processor ends, and

a weldment seal adapted to be applied to the exhaust inlet, exhaust processor, and exhaust outlet modules at a junction between each pair of coupled adjacent modules to provide an annular sealed connection at each junction and to establish a rigid exhaust processor assembly comprising in series the exhaust inlet module, the at least two separate exhaust processor modules, and the exhaust outlet module.

11. The kit of claim 10, wherein an upstream portion of each of the at least two separate exhaust processor modules is formed to provide the female processor end, a downstream portion of each of the at least two separate exhaust processor modules is formed to provide the male processor end, a downstream portion of the exhaust inlet module is configured to provide a male end adapted to be coupled to the female processor end of the upstream portion of a first in a series of the at least two separate exhaust processor modules, and an upstream portion of the exhaust outlet module is configured to provide a female end adapted to be coupled to the male processor end of the downstream portion of a last in the series of at least two separate exhaust processors.

12. The kit of claim 10, wherein an upstream portion of each of the at least two separate exhaust processor modules is formed to provide the male processor end, a downstream portion of each of the at least two separate exhaust processor modules is formed to provide the female processor end, a downstream portion of the exhaust inlet module is configured to provide a female end adapted to

- be coupled to the male processor end of the upstream portion of a first in a series of the at least two separate exhaust processor modules, and an upstream portion of the exhaust outlet module is configured to provide a male end adapted to be coupled to the female processor end of the downstream portion of a last in the series of at least
- 5 two separate exhaust processors.
13. A modular exhaust processor assembly comprising
an exhaust inlet module adapted to be coupled to a combustion product
source pipe in a vehicle exhaust system,
an exhaust outlet module adapted to be coupled to a combustion
- 10 product discharge pipe,
at least two separate exhaust processor modules arranged to lie in
series in end-to-end relation to provide a module conduit having an inlet end coupled
to the exhaust inlet module to receive combustion product discharged therefrom and
an outlet end coupled to the exhaust outlet module to cause combustion product that
- 15 has passed through each of the separate exhaust processor modules to be discharged
from the module conduit into the exhaust outlet module, and
a plurality of sealed connectors, each sealed connector being arranged
to establish a sealed connection between ends of pairs of adjacent modules, each
sealed connector including a male connector portion located on a first module, a
- 20 female connector portion located on an adjacent second module and coupled to said
male connector portion to define a junction between the first and second modules, and
a weldment seal arranged to provide an annular sealed connection at the junction
between the first and second modules.
14. The assembly of claim 13, wherein the at least two separate
- 25 exhaust processor modules include a first modular contaminant filter positioned to lie
between the exhaust inlet and outlet modules and a modular noise filter interposed
between the first modular contaminant filter and the exhaust outlet module.
15. The assembly of claim 14, wherein the at least two separate
exhaust processor modules further include a second modular contaminant filter
- 30 interposed between the first modular contaminant filter and the modular noise filter.
16. The assembly of claim 13, wherein the at least two separate
exhaust processor modules include a modular noise filter positioned to lie between the

exhaust inlet and outlet modules and a first modular contaminant filter interposed between the modular noise filter and the exhaust outlet module.

17. The assembly of claim 16, wherein the at least two separate exhaust processor modules further include a modular exhaust flow diffuser interposed
5 between the modular noise filter and the first modular contaminant filter and the modular exhaust flow diffuser is configured to interrupt the flow of combustion product passing therethrough to substantially uniformly distribute the flow of combustion product across an inlet face of a catalyzed substrate included in the first modular contaminant filter to load the catalyzed substrate substantially evenly to
10 enhance combustion product treatment efficiency of the catalyzed substrate included in the first modular contaminant filter.

18. The assembly of claim 16, wherein the at least two separate exhaust processor modules further include a second modular contaminant filter interposed between the first modular contaminant filter of the exhaust outlet module.

- 15 19. The assembly of claim 13, wherein the at least two separate exhaust processor modules include a modular noise filter positioned to lie between the exhaust inlet and outlet modules and a modular tuning volume container interposed between the exhaust inlet module and the modular noise filter and coupled to the modular noise filter to add tuning volume to the modular noise filter.

- 20 20. The assembly of claim 13, wherein one of the at least two separate exhaust processor modules has an exterior sleeve formed to include the male and female connector portions thereof and sized to have a first thickness and another of the at least two separate exhaust processor modules has an exterior sleeve formed to include the male and female connector portions thereof and sized to have a second
25 thickness different from the first thickness.